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October 4, 2001

Mr. David E. Mosby, R.G.
Environmental Specialist
Superfund Section
MDNR, Hazardous Waste Program
PO Box 176
Jefferson City, MO 65102

Mr. Tony Petruska
Project Manager
US EPA, Region VII
901 North 5th Street
Kansas City, Kansas 66101

RE: **Revised Interim Slag Pile Runoff Control Plan**
Doe Run Company Herculaneum Smelter

Gentlemen:

On behalf of The Doe Run Company, I am submitting a revised Interim Slag Pile Runoff Control Plan pursuant to Paragraph IV.1 of the Statement of Work included as Appendix A of the May 2001 Administrative Order on Consent (A.O.C.). The revised plan has been prepared in response to your letter dated September 4, 2001 with comment enclosures. For your convenience, I am providing a list of references to your comment enclosures and where the comment is addressed in the revised report. It is respectfully requested that a review of the Slag Pile/Surface Water/Sediment Sampling and Analysis Plan (SAP) in conjunction with the NRDA Pre-Assessment Report be completed prior to finalizing any comments on the revised Interim Slag Pile Runoff Control Plan.

Enclosure 1:

Comment	*Response*
1.	Refer to cover page of report.
2.	Reference Section 2.0.
3.	Reference Section 3.3.2 (first sentence).

Enclosure 2:

Comment	*Response*
General Comments	Reference Section 3.1.2, 4.2, and 2.0 in conjunction with the three comments.

NRD Comments	*Response*
Paragraph 1	Intent of comment was not clear, however we believe the comment is generally addressed in Section 2.0.

Paragraph 2	The required plan is a runoff and erosion control plan, therefore air emissions were not addressed. The water runoff comments are addressed in Sections 2.0 and 3.0.
Paragraph 3	This comment may be more appropriately addressed as part of the NRDA Pre-assessment Report.

Enclosure 3:

Comment	*Response*
Paragraph 1	No response required.
Paragraph 2	Reference Section 2.0.
Paragraph 3	Reference Section 2.0 and 3.0.
Paragraph 4	Reference Section 2.0.
Paragraph 5	Reference Section 2.0.
Paragraph 6	Reference Section 2.0 and 4.0.
Paragraph 7	Reference Section 2.0, 3.0, 4.0 and 5.0.

Enclosure 4:

Comment	*Response*
Item 1A and B	Reference Section 2.0.
Item 1C	Reference Section 3.3.1.
Item 2	Reference Section 2.0.
Item 3	Reference Section 2.1 and 4.0.

If you have any questions or require clarification, please call Jim Lanzafame at (636) 933-3143 or me at (573) 638-5018.

Sincerely,

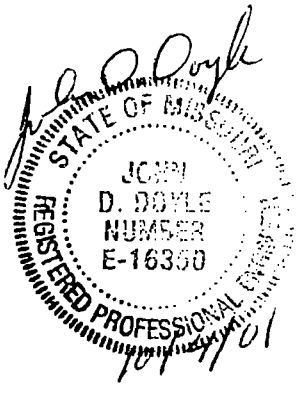
John D. Doyle, P.E.
Senior Consultant

JDD/jms

The Doe Run Company—Herculaneum
Interim Slag Pile Runoff Control Plan

Prepared in Response to
US EPA Region 7 Administrative Order on Consent

Original – July 2001
Revised – October 2001



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The Doe Run Company – Herculaneum
Interim Slag Pile Runoff Control Plan

Original – July 2001

Revised – October 2001

Prepared in Response to

US EPA Region 7 Administrative Order on Consent

Table of Contents

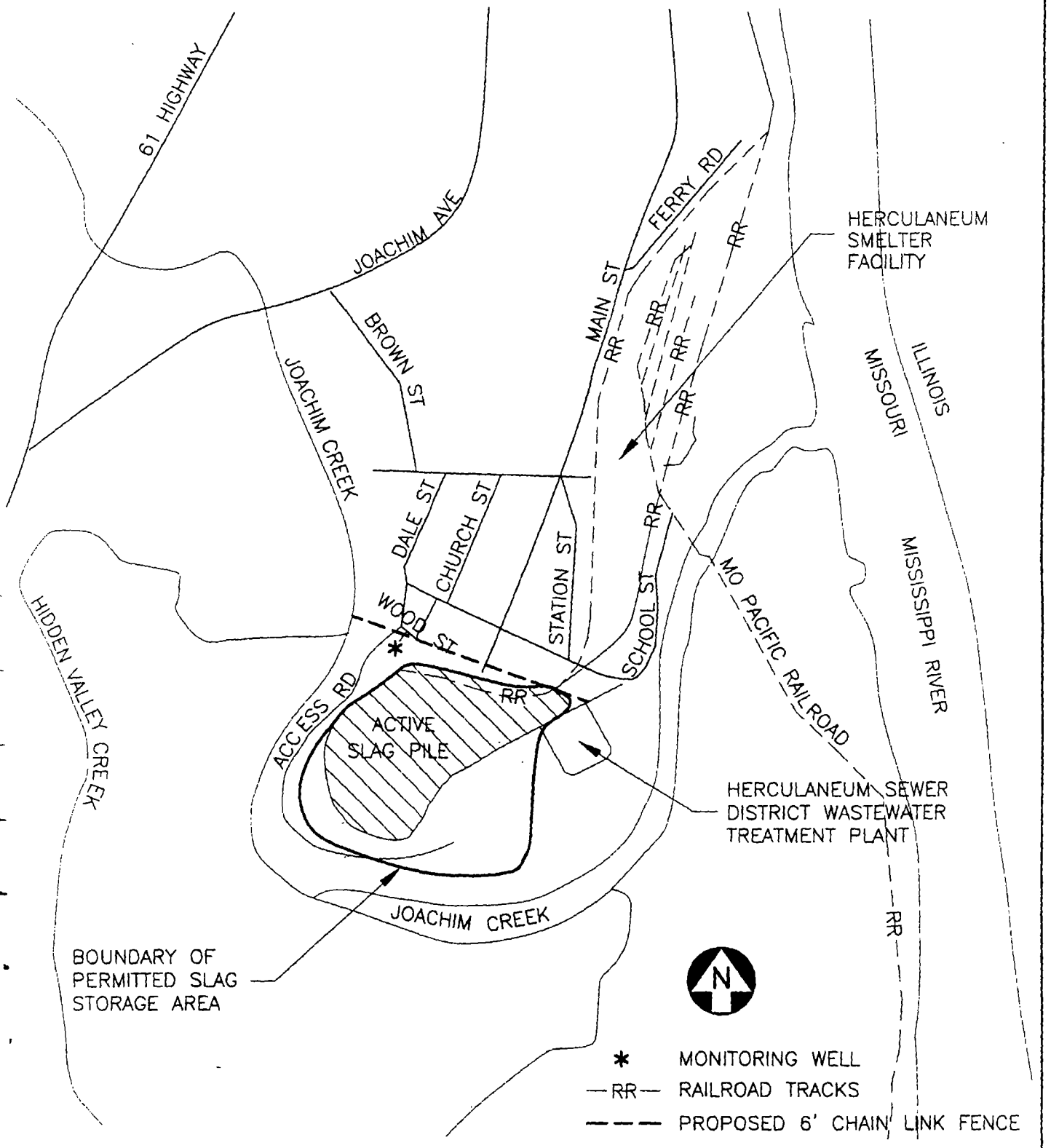
1.0 Introduction

In compliance with Statement of Work, Appendix A, Item IV.1. of US EPA Region 7, Administrative Order on Consent (A.O.C.) effective May 29, 2001, and the EPA comment letter dated August 28, 2001, The Doe Run Company is submitting a revised Interim Slag Pile Runoff Control Plan for the lead smelter slag pile located at The Doe Run Herculaneum facility. This facility is a primary lead smelter that has been in operation for over 100 years. The facility consists of two main areas, comprising the smelter facility and slag storage area, located on the U.S. Geological Survey (USGS) Herculaneum 7.5-minute quadrangle map in Section 20 and Section 29, Township 41 North, Range 6 East. Reference Figure 1 for location and details of the areas.

The first area within the plant property is the smelter facility, which occupies approximately 52 acres. This area is bounded on the east by the Mississippi River, on the north and west by a residential area, and on the south by the slag pile and the Herculaneum Sewer District Wastewater Treatment Plant. The facility receives lead concentrate, which passes through several processes, resulting in the primary production of several products including lead and by-product commercial-grade sulfuric acid. In addition, the smelting process produces a waste product known as slag. This is stored in the slag storage area.

The second area within the plant property is the slag storage area located south/southwest of the smelter facility in the Joachim Creek bottomland. This area is part of a Metallic Minerals Waste Management Area that was permitted in 1992 under Missouri's Metallic Minerals Waste Management Act. The portion of the waste management area designated for storage of slag is referred to as the slag storage area, and it encompasses approximately 42 acres with the active portion of the slag storage area, referred to as the slag pile, occupying approximately 27 of those acres. The slag pile is located on the north and west portion of the slag storage area.

The slag storage area is bounded on the south, southeast, and west by Joachim Creek; on the east by the Herculaneum Sewer District Wastewater Treatment Plant; and the north by a residential area and the smelter facility. Vehicular access to the slag storage area is restricted, but can be obtained at one of three places. The primary access is located at the northeast corner of the slag storage area. This road is used by vehicles from the smelter facility to access the slag pile, the southeast portion of the slag storage area, and the Herculaneum Sewer District Wastewater Treatment Plant. The second access location off of Wood Street is located at the northwest corner of the slag storage area and is



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Date	9/27/01
Drawn	SDL
Checked	
Designed	
Approved	

THE DOE RUN COMPANY
HERCULANEUM, MO

GENERAL SITE MAP

BARR PROJECT No. 25/51-017
DWG. No. FIGURE 1
SHEET No.
REV. No.

used to access the slag pile, the south and west portions of the slag storage area, and several of the monitoring wells in the slag storage area. The third access location is located approximately 50 feet east of the northwest access road and is used to access a monitoring well located immediately south of Wood Street.

This document is a plan to deal with short-term measures for run-on and runoff control from the slag pile. This plan describes and evaluates the current stormwater run-on and runoff control measures for the slag pile, as well as the in-place security measures for restricting access to the slag pile. Also included are recommended improvements to the existing measures to increase their effectiveness.

2.0 Evaluation of A.O.C. Specified Short-Term Measures

The Statement of Work-Appendix A, Item IV.1.A. of the A.O.C. requires Doe Run to develop a list and evaluation of short-term measures to control runoff and erosion of particulate slag from the site and specifies interim measures to be considered in the evaluation. The following is a listing and evaluation of interim measures considered.

2.1 Increased Security to Keep Unauthorized People Off of the Slag Pile

The Doe Run Company has evaluated this requirement and determined that it is not feasible to increase security to the extent that all access to the slag pile by unauthorized persons determined to gain access can be physically prevented. However, Doe Run plans to increase security to better restrict unauthorized access to the slag pile, in addition to providing no trespassing notices along the perimeter of the slag pile, the chain-link fence, and the bank of Joachim Creek. The details of the increased security measures are described elsewhere in this report.

2.2 Use of Hay Bales, Silt Fences or Interceptor Trenches

Stormwater run-on is currently diverted from the slag pile by utilization of a diversion or interceptor trench (drainage swale) north of the slag pile. Design calculations for a 10-year/24-hour storm event shall be completed to determine if the existing drainage swale can meet this criteria. If necessary, the drainage swale will be reconstructed to meet the 10-year/24-hour storm event.

The original Interim Slag Pile Runoff Control Plan determined that due to the predominant grain size of the slag, erosion of the slag was not evident and not an issue that needed to be addressed as a short-term measure. The regulatory agency comments expressed concern that fine-grained material is also incorporated within the slag pile and may move from the slag pile carrying contaminants during periods of runoff. In an effort to minimize movement of fine-grained material from the slag pile during periods of potential runoff, a combination of straw or hay bales and silt fences will be utilized along the west, south and east perimeters of the slag pile. Specifics on utilization of hay bales and/or silt fences are provided within the recommended improvements to runoff controls section of this report.

2.3 Stormwater Retention

The extent of contaminant migration by stormwater flow from the slag pile and the need for stormwater retention is unknown at this time. Even if stormwater flow were broadly interpreted to include water seepage from the slag pile after it has become saturated, the environmental impact of contaminant seepage from the slag pile has not been clearly established. Measurement of contaminant migration is to be evaluated as part of the Slag Pile/Surface Water/Sediment Sampling and Analysis Plan (SAP) required under Appendix A, Item IV.2. of the A.O.C. As stated in the A.O.C., "The purpose of this plan shall be to collect sufficient data to identify the source and transport pathways of contaminants, as well as provide a basis for characterizing the exposure risks and injury posed by the contaminants and evaluating potential management options." After implementation of the SAP and approval of the subsequent Slag Pile/Surface Water/Sediment Assessment Report, Doe Run is required to submit a slag pile option evaluation report in accordance with Appendix A, Item IV.3. of the A.O.C. One of the requirements of the evaluation report is "implementing interim measures to manage releases from the slag pile while it is still in operation." One of the interim measures specified to be evaluated is "trenches and settling ponds to capture all of the runoff from the pile."

The need for stormwater retention will be evaluated as part of the SAP and assessment report and subsequent slag pile options evaluation report. The determination that stormwater retention is needed as a short-term measure to prevent contaminant migration prior to sampling and assessment for contaminant migration would be premature. The determination as to the need for stormwater retention will be made in accordance with the schedule outlined in the A.O.C.

2.4 Berming

The need for construction of a berm around the slag pile as a short-term measure would primarily be to prevent erosion of the slag by erosion due to floodwaters. A review of a FEMA flood insurance map and a flood insurance study applicable to the Herculaneum area demonstrates that the slag pile is within the 100-year flood plain of Joachim Creek, but not the floodway. This information along with historical visual observations illustrates that the slag pile is subject to flood backwater, but not within the flood currents. In order to have the potential for significant erosion of the slag, the slag pile must be exposed to the current of floodwaters.

The other potential concern from flood waters reaching the slag is the same as precipitation. The floodwaters could saturate portions of the slag pile and potentially allow contaminants to migrate

from the slag pile along with fine materials. Again, contaminant migration due to saturation of the slag pile has not been clearly established and will be evaluated through the SAP and subsequent Slag Pile/Surface Water/Sediment Assessment Report. Also some of the specified interim measures to be evaluated as part of the Slag Pile Response Options Evaluation Report include "construction of a levee surrounding the pile" and "a berm or rip rap cover around the circumference of the pile to protect it from high velocity flood events." The construction of a berm around the slag pile is not warranted as a short-term measure and the final assessment for the need of a berm will be completed in accordance with the schedule specified in the A.O.C.

2.5 Evaluation Parameters

Appendix A, Item IV.1.A. of the A.O.C. specifies several parameters to be considered in evaluating the short-term measures, such as:

- Rate, extent and magnitude of nearby contamination—These items have not been quantitatively measured yet and are scheduled to be evaluated under Item IV.2 and 4 of the A.O.C. Until the rate, extent and magnitude of nearby contamination have been determined, there is no rationale for trying to achieve total containment of runoff from the slag pile.

- Potential for integration into a long-term plan for control of the site—The increased security measures and run-on diversion structure would be expected to be compatible and be integrated into the long-term plan. The short-term measures of silt fence and hay bales would most likely not be needed as part of the long-term plan, but they are compatible with any selected long-term plan and might be needed during implementation of the long-term plan.

- Effectiveness, implementability and cost—The short-term measures evaluated and selected are expected to be relatively effective, relatively easy to implement within the A.O.C. specified 120-day time frame, and economically feasible as short-term measures.

3.0 Stormwater Control Measures

3.1 Evaluation of Current Run-on Control Measures

3.1.1 Drainage Swale on North Side of Slag Pile

The slag pile is located on the north side of the slag storage area in the Joachim Creek bottomland. The north side of the slag pile is bounded by a railroad spur. This spur enters the slag storage area from the smelter facility on the northeast side of the slag pile and follows the northern edge of the slag pile until it reaches the western edge of the slag pile. Separating the railroad spur and the residential area to the north of the slag storage area is a rugged, heavily vegetated and wooded slope with a relatively steep grade. At the toe of the slope, immediately north of the railroad spur, is a drainage swale. Potential stormwater run-on that may enter the slag storage area from the residential area is diverted away from the slag pile by this drainage swale.

The eastern portion of this swale is very shallow with a slight grade to the west. This portion of the swale, as well as the area around the swale, has several areas that pond a small amount of water. As the swale progresses to the west, it intersects a PVC pipe. This pipe carries the stormwater approximately 200 feet to the western portion of the drainage swale, which is a more defined v-notch drainage ditch that runs along the remaining length of the railroad spur. At the western end of the swale, the stormwater outlets into a natural drainageway that carries the water to Joachim Creek.

3.1.2 Slope of Area Surrounding Slag Pile

The slag storage area is located in the Joachim Creek bottomland on the south end of the city of Herculaneum. The slag pile is located in the north and west portions of the slag storage area. The topography of the area north of the slag pile slopes from north to south. Stormwater runoff from the area north of the slag pile and from a portion of the residential area north of the slag storage area drain to the south towards the slag pile. This runoff is intercepted by the diversion swale located immediately north of the slag pile and diverted to the west into Joachim Creek. Verification of this was made during a site inspection on January 11, 2001, by representatives of Barr Engineering.

The topography of the small portion of the slag storage area west of the slag pile slopes from east to west. A visual inspection of this area during the site visit revealed that the grade of this area is very

flat. However, there is enough grade to allow the stormwater runoff from this area to drain away from the slag pile towards Joachim Creek.

The topography of the remainder of the slag storage area slopes from the northwest to the southeast. A visual inspection of this area during the site visit revealed that the grade of this area is also very flat. However, there is enough grade to allow the stormwater runoff from this area to drain away from the slag pile towards Joachim Creek.

3.1.3 Direct Rainfall

Rainfall on the perimeters of the slag pile is diverted away from the slag pile by a diversion swale located on the north side of the slag pile or by the topography of the natural ground. Therefore, the only precipitation that comes into contact with the slag pile is from direct rainfall and not from stormwater run-on. A visual inspection of the slag pile revealed that a majority of the slag pile is comprised of a material that has a grain size equivalent to a medium-grained to coarse-grained sand. With this type of material, any rainfall that encounters the slag pile will quickly infiltrate into the slag pile. Since stormwater from the surrounding area does not run onto the slag pile, and direct rainfall quickly infiltrates into the slag pile, there is little to no immediate direct runoff from the slag pile. Consequently there does not appear to be significant stormwater run-on control issues associated with the slag pile.

3.2 Evaluation of Current Runoff Control Measures

The slag pile, which is located in the north and west portions of the slag storage area, has a footprint that covers approximately 27 acres. Initially the slag from the smelting facility was brought to the slag storage area by rail car and dumped alongside the tracks. Currently Doe Run utilizes off-road dump trucks to transport the slag from the smelter to the slag pile. Periodically the top of the slag pile has been graded to allow continued access and unloading of slag onto the slag pile. Deposition of the slag in this manner has resulted in the slag pile ranging from approximately 15 to 50 feet high with side slopes close to the angle of repose for this type of material.

Although the slag contains some fines, much of the slag pile is comprised of material that is equivalent in grain size to a medium-grained to coarse-grained sand. Material of this type has a moderate permeability rate that ranges from 10^{-1} cm/sec to 10^{-3} cm/sec. A permeability rate in this range would result in a high amount of infiltration into the slag pile, which would dramatically decrease the amount of direct runoff from the slag pile. A high precipitation infiltration rate was

substantiated by an inspection of the slag pile completed during the site visit of January 11, 2001. This inspection revealed few signs of water collecting on the slag pile, as well as few signs of erosion on any of the sideslopes. Therefore, it was concluded that there was little erosion of particulate slag, and rapid discharge stormwater runoff control issues associated with the slag pile were relatively minor, if any.

3.3 Recommended Improvements to Existing Run-on / Runoff Control Measures

3.3.1 Run-on

Any potential stormwater run-on that may enter the slag pile would come from the residential area to the north of the slag storage area. The drainage swale north of the slag pile appears to be doing an adequate job of diverting stormwater run-on from the slag pile. However, the capacity of the swale is unknown and it is recommended that, at a minimum, some maintenance be performed on the drainage swale. The recommended maintenance would include regrading the eastern portion of the swale to eliminate any ponding areas and ensuring that the area drains to the west towards the pipe. It is also recommended that the western portion of the drainage swale be evaluated and maintained if needed to ensure that it is free draining to Joachim Creek. After the regrading work on these two areas has been completed, it is recommended that an elevation survey be conducted along the entire swale to verify that it drains to the west.

Within 30 days of approval of this plan and prior to performing the recommended maintenance, design calculations shall be completed to determine if the drainage swale can carry a 10-year/24-hour storm event. If the drainage swale does not have the needed capacity, the drainage swale shall be redesigned and constructed within the time frame specified in the Administrative Order to carry a 10-year/24-hour storm event. The 10-year/24-hour storm capacity would divert all of the runoff from most of the storm events. Storm events exceeding a 10-year/24-hour event may exceed the capacity of the drainage swale. However, the majority of run-on that may exceed the capacity of the diversion ditch would still be diverted from the slag pile due to the land terrain and configuration of the slag pile, which promotes drainage to the west.

3.3.2 Runoff

There are no visible indications that particulate slag erosion or immediate direct stormwater runoff from the slag pile is occurring. In addition, as long as the predominant slag material grain size

continues to be equivalent to a medium-grained to coarse-grained sand, it is unlikely that significant immediate direct stormwater runoff from the slag pile will occur in the future. The majority of runoff from the slag pile results from precipitation infiltrating the slag pile, saturating portions of the slag pile and seeping out from the base of the pile.

In an effort to minimize fines moving away from the slag pile through immediate direct runoff or seepage, silt fences will be utilized along the west, south and east perimeters of the slag pile as a short-term measure. A silt fence will be constructed approximately 50 to 100 feet from the toe of the slope along the west, south and east perimeters of the slag pile. In addition, straw or hay bales shall be placed in the low points (localized drainage ditches) along the silt fence as needed to more effectively collect fines in the localized areas of heavier runoff.

4.0 Security Measures

4.1 Evaluation of Current Measures

The description of existing security measures reflect site conditions as of January 11, 2001, the date upon which representatives of Barr Engineering visited the site. Some upgrades to the security system have been made since that date, such as replacement of the two referenced steel cables across access roads with metal gates.

4.1.1 Natural Boundaries

The existing security measures focus on minimizing access to the slag storage area for on and off-road vehicles. This has been accomplished primarily by utilizing the existing natural boundaries, supplemented with fencing at specific locations. The most notable of the existing natural boundaries is Joachim Creek. The creek bounds the slag storage area on the west, south, and east sides. While it might be possible to bring an off-road vehicle across the creek during periods of low water, it is unlikely that such an access route would be significantly utilized.

The other major natural boundary that prevents vehicular traffic from entering the slag storage area is portions of the slope north of the slag storage area. The eastern two-thirds of this slope is heavily wooded, along with dense underbrush and other vegetation in addition to having a relatively steep grade. There are also several gullies and natural drainage swales along this portion of the slope that make driving across the slope difficult. The western one-third of the slope is not as steep, rugged, or heavily vegetated or wooded. However, there is an existing fence at the top of the slope to prevent vehicles from accessing the slag storage area.

4.1.2 Fencing

The fence located along the western portion of the slag storage area's northern boundary runs from the top of a very steep slope along Joachim Creek (starting approximately 50 feet west of the northwest access road) to the southeast corner of the back yard of the property located at the eastern end of Wood Street. This fence is approximately 250 feet long and is made of a combination of suspended cable and chain-link fencing. The cable portion of the fence stretches from approximately 50 feet west of the northwest access road and extends approximately 150 feet to near the east end of Wood Street. The cable is approximately ¾-inch in diameter and is suspended two to three feet off

the ground. There are two access roads through the stretch of suspended cable fence. The northwest access road to the slag storage area off of Wood Street and the monitoring well access road off of Wood Street are both secured by suspended cable (replaced with locked metal gates) across the road and padlocked in place.

The chain-link portion of the fence stretches from the east end of Wood Street to the southeast corner of the back yard of the property at the eastern end of Wood Street where it ends abruptly. This section of chain-link fence is approximately 100 feet long and 5 feet high anchored to steel fence posts. This section of fence does not cross any access roads, and there are no gates in this section of the fence.

4.1.3 Access Roads

Access to the slag storage area can be obtained from one of three locations. These locations include the access road from the smelter facility, the northwest access road, and the monitoring well access road. The access road from the smelter facility accesses the slag storage area at the northeast corner of the slag pile. This road is used to access the slag pile, the overall slag storage area, and the Herculaneum Sewer District Wastewater Treatment Plant. There is no gate across this access road. However, use of this access is restricted since the road is part of the smelter facility operations ongoing 24 hours a day.

The second access location is the northwest access road located at the northwest corner of the slag storage area off of Wood Street. This road is used to access the slag pile, the south and west portions of the slag storage area, and several of the monitoring wells in the slag storage area. Security for this access road is provided by the stretching of a steel cable (replaced with a locked metal gate) across the road entrance and padlocking the cable in place.

The third access location, the monitoring well access road, is located approximately 50 feet east of the northwest access road along Wood Street. This road is used to access a monitoring well located immediately south of Wood Street. A steel cable (replaced with a locked metal gate) is stretched across the access entrance between two posts and padlocked in place for security.

4.2 Recommended Improvements to the Existing Security Measures

As previously noted, The Doe Run Company has evaluated the recommended short-term measure of increased security to keep unauthorized people off of the slag pile. Doe Run has determined that it is not feasible, as a short-term measure, to increase security to the extent that all access to the slag pile, by unauthorized persons determined to gain access, can be physically prevented. Maintenance of a chain-link fence in a flood prone area is difficult to maintain and does not prevent access to the slag pile by foot if someone is willing to climb the fence.

Currently, the easiest access to the slag pile is from the north. This area is also closest to the residential area and the most likely way to gain access to the slag pile on foot or by all-terrain vehicles (ATV) or dirt bikes. Doe Run plans to install six-foot chain-link fencing and gates along the north perimeter tying into the existing natural barriers and plant facilities. The six-foot high chain-link fencing and existing natural barriers will serve as deterrents to access onto the site. In combination with the access deterrents, signs will be posted along the fence, the perimeter of the slag pile, and along Joachim Creek warning unauthorized personnel to keep out.

The goal of the increased security measures will be to prevent vehicle access from the north side of the slag storage area, provide a deterrent to foot traffic, and inform anyone trying to gain access by foot or other means from any direction that trespassing is prohibited. Doe Run acknowledges that someone willing to cross the existing natural barriers or climb the chain-link fence can gain access to the site, but they will be knowingly trespassing in violation of Missouri's trespassing law. It is emphasized that it is not the goal of the increased security measures to prevent any access to the slag pile by anyone determined to gain access but rather to reasonably deter access and sufficiently post notice that entry onto the slag storage area is not allowed.

4.2.1 Chain-Link Fence and Gates

A six-foot high chain-link fence will be constructed along the north and northeast boundary of the slag storage area replacing the current chain-link and cable fence. The six-foot chain-link fence will extend from the east bank of Joachim Creek to the northeast corner of the existing chain-link fence surrounding the Herculaneum Sewer District Wastewater Treatment Plant. The west end of the fence will be at the edge of the steep bank of Joachim Creek, which is difficult to traverse even by foot. The east end of the fence will be at the connection with the wastewater treatment plant perimeter fence and is within the operating area of the Doe Run facility.

Six-foot chain-link gates will be placed across all three access roads, and the gates will be capable of being locked. The gate across the access road from the smelter facility at the northeast corner of the slag pile will be locked when slag is not being hauled to the slag pile. The other access road gates will be locked at all times and unlocked only for ingress and egress.

4.2.2 Natural Barriers

The Joachim Creek serves as a natural barrier or deterrent for vehicular and foot access to the slag storage area. One area of Joachim Creek near the northwest corner of the slag pile may be crossable by ATV during periods of low water. "No Trespassing" signs will be placed within easy view of this area and if this area becomes utilized on a regular basis to gain unauthorized access, additional security measures, specific to this area, can be implemented.

It is acknowledged that access by boat, during periods of high water, can be gained from the Mississippi River. However, such access will be a knowing violation of trespassing laws because of the signs posted along the bank of Joachim Creek and the slag pile.

4.2.3 Posting of Perimeter Boundaries

The perimeter of the slag pile will be posted with signs specifically prohibiting unauthorized entry. The signs will read "WARNING - UNAUTHORIZED PERSONNEL KEEP OUT", or similar language, and will be placed approximately every 100 feet. The signs will be approximately 12 inches square or larger consisting of bold lettering on contrasting background. In addition, signs will be placed at all entrances and along the chain-link fence to be constructed. Signs shall also be placed along the bank of Joachim Creek around the perimeter of the site and specifically at locations with the highest potential for the natural barrier to be breached.

In most cases, this arrangement for placement of signs will provide two rows of signs that must be passed prior to access onto the slag pile. In addition, purple paint may be used to mark periodic locations along the bank of Joachim Creek. Purple paint is the legally recognized symbol for no trespassing.

5.0 Assessment of Short-Term Measures

5.1 Effectiveness of Recommended Modifications

During the January 11, 2001 site visit, several issues involving the slag pile were evaluated. These issues included existing stormwater run-on and runoff control, as well as existing security related to on and off-road vehicles and foot traffic accessing the slag pile. Although the existing structures were functional, it was determined that some modifications and maintenance to the structures would improve their effectiveness.

For the stormwater run-on control, it is recommended that the drainage swale on the north side of the slag pile be evaluated to ensure that it drains to the west and confirm that it can carry a 10-year/24-hour storm event. Immediate direct runoff from precipitation does not appear to be an issue for the slag pile due to the coarse nature and high infiltration rate of the slag material. The majority of runoff from the slag pile results from precipitation saturating the slag pile and seeping out of the base of the slag pile. As a means to control direct and indirect (seepage) runoff from the slag pile, a combination of silt fence strategically reinforced with hay bales will be utilized. This is an effective method of silt control. However, location of this measure within a flood prone area will increase maintenance and may reduce the effectiveness of the system.

Several recommendations are made to the existing security measures for restricting access to the permitted slag storage area and slag pile. The recommended modifications include construction of a six-foot chain-link fence and gates along the north and northeast perimeter and posting of keep out signs along the fence and along the perimeters of the slag pile and banks of Joachim Creek. The additional security measures will reduce the ease of access by off-road vehicles or foot traffic, but will not prevent access by someone determined to get onto the slag pile and willing to knowingly violate trespass laws.

5.2 Implementation and Integration into Long-Term Plans

The recommended modifications to the existing run-on control and security measures are not difficult to implement and can be completed within 120 days after agency approval of the Interim Slag Pile Runoff Control Plan as specified in the EPA Administrative Order on Consent, weather permitting.

The existing measures have been relatively effective, and the modifications are recommended as an extension of these measures. Therefore, it is anticipated that any long-term plan for control of the site will either incorporate these measures as part of the overall plan or be compatible with the plan. While the details of the long-term plan are not known at this time, it is recommended that some of the short-term measures be integrated as an integral part of the long-term plan when it is developed.

6.0 Conclusions

This Interim Slag Pile Runoff Control Plan evaluates and recommends modifications of the measures to control runoff and erosion of particulate slag from the slag pile at The Doe Run Company Herculaneum facility. On January 11, 2001, a site visit by representatives of Barr Engineering was made to evaluate the adequacy of existing measures for run-on and runoff control, and security measures to control access to the slag storage area and slag pile. This visit revealed that the existing stormwater run-on control measures appeared to be adequately diverting run-on to the site. The visit also revealed that there does not appear to be significant immediate direct stormwater runoff control issues associated with the slag pile due to the coarse grain size and high infiltration rate of the slag, however seepage from the base of the slag pile due to saturation of the pile was evident. The site visit also revealed that while the existing security measures for the slag storage area were functional, improvements could be made to restrict unauthorized on and off-road vehicular and foot traffic access to the slag pile.

To increase the effectiveness of each of the existing measures, maintenance to the stormwater run-on control structure and modifications to the access control measures are recommended. For the stormwater run-on control measures, it is recommended that the drainage swale along the north side of the slag pile be evaluated, with maintenance as necessary to ensure proper drainage and capacity to carry a 10-year/24-hour storm event. This will ensure that the swale is capable of handling storm flow, as well as verify that it drains to the west. Utilization of silt fences and hay bales for improved silt control of potential direct runoff, as well as seepage runoff, are recommended.

Several modifications are recommended for in-place security measures pertaining to improvement of restriction of access to the slag pile. These modifications include construction of a six-foot chain-link fence along the north and northeast perimeter of the slag storage area and six-foot chain-link gates across all three accesses. In addition to posting keep out signs along the fence, keep out signs will be posted along the perimeter of the slag pile as well as Joachim Creek. These modifications will further discourage unauthorized access to the slag storage area and slag pile.

The aforementioned recommendations can be implemented in accordance with the A.O.C. required time frame contingent upon weather conditions. The short-term measures are an extension to measures already in place and are economically feasible as short-term measures. They are expected to be effective and can be integrated into any long-term plan for control of the site.